UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,378	10/12/2006	Thomas Christ	6741P090	8055

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EXAMINER
MOFFAT, JONATHAN

ART UNIT	PAPER NUMBER
2863	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/562,378	CHRIST ET AL.
	Examiner	Art Unit	
	Jonathan Moffat	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 May 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-31</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-31</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>23 December 2005</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

The abstract of the disclosure is objected to. Please submit a clean copy of the abstract on its own page for the record. Correction is required. See MPEP § 608.01(b).

A substitute specification is required pursuant to 37 CFR 1.125(a) because the copy currently held by the office is not properly formatted for the record. The claims too are incorrectly formatted and all should be scaled to fit the page.

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.

Claims 1-7, 9-20 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Poppen (US pat 5916299) in view of Tabata (US pat 4982329), Jacobs (US pat pub

20030030399), Teig (US pat 6879934) and McNeil (US pat 6429016).

With respect to claims 1 and 13, Poppen discloses a method comprising:

A first step of determining the distance within the source zone between the first location

and an exit node of the source zone (Fig 5 item 303).

A second step of determining the distance between the exit node of the source zone and

an entry node of the destination zone (Fig 5 item 305).

A third step of determining the distance within the destination zone between the entry

node of the destination zone and the second location (Fig 5 item 304).

A fourth step of obtaining the path length by summing up the distances determined in the

preceding slaps (Fig 5 item 306 and column 6 lines 27-41 and column 10 lines 32-34).

With respect to claim 19, Poppen discloses a method comprising:

A first step of defining a first plurality of zones, each zone representing a grouping of

bins, or a work center, whereby with each zone, at least one node is associated, the node

representing an entry and/or exit point for resources to/from the zone (Fig 6), and whereby with

each bin and with each node in a zone, coordinates are associated which are representative of their location in the zone (column 4 lines 11-20).

A second step of defining a first plurality of routes, each route representing a path for movement of a resource between nodes of a pair of zones (Fig 6 items A-C and B-E etc), whereby with each of the routes, a path length is associated which is representative or the length of the route (Figs 5-6).

A third step of defining a second plurality of routes, each route representing a path for movement of a resource within a zone between a bin and a node of the zone (Fig 6 items C-D and D-F etc), whereby with each of the routes, a path length is associated which is representative of the length of the route (Fig 5-6).

With respect to claims 2 and 6, Poppen discloses distances within zones (column 1 line 40) which must have been determined or calculated at some point according to a metric given the broadest reasonable interpretation of the term. The examiner is unsure what sort of metric is excluded by the limitation of "Euclidean or Manhattan metric". Euclidean allows for line interconnections in any direction. However, to further show obviousness, the examiner points to reference Teig, which discloses both sorts (Figs 2 and 18 and column 4 liens 41-50) in determining distances between points.

With respect to claims 4-5, Poppen discloses locations and nodes defined be coordinates (column 4 lines 11-20).

With respect to claim 9, Poppen discloses that the distances between nodes of two different zones are looked up in a table which comprises pro-calculated distances of each pair of nodes of different zones (Fig 4 and column 11 line 64 – column 12 line 7).

With respect to claim 11, Poppen discloses a route based on properties of at least one of a resource, a route and a node (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claims 12 and 16, Poppen discloses a path determined which is the shortest path between the first and second locations (Fig 8b item 331b).

With respect to claim 17, Poppen discloses that the one path is determined which satisfies best a cost criterion, the cost criterion taking into account at least one of distances of the routes, travel time for the resource on the routes, and characteristics of the resources (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claim 18, Poppen discloses that each route determining step is followed by a step of calculating a cost criterion, whereby calculating the cost criterion takes into account at least one of distances of the respective determined route, travel time for the resource on the respective determined route, and an average value of characteristics of all the resources for the respective determined route (Figs 4 and 8a-b and column 1 lines 35-48).

With respect to claims 29-31, Poppen discloses computer-readable storage medium for running such a program (column 1 lines 35-48).

With respect to claims, 1, 10, 13 and 19, Poppen fails to disclose paths in a warehouse for movement of resources between locations.

With respect to claims 1, 13 and 19, Poppen discloses determining the path between points and states that the distance is known (column 1 lines 35-48 and column 4 lines 11-20). Although Poppen does not use the language of "determining the distance" per se one of ordinary skill in the art would understand that this is one output data Poppen would generate. Even

though this is obvious, the examiner points to references Jacobs and Tabata below which further show this as obvious in the application of a robot.

With respect to claims 3 and 7, Poppen fails to disclose how distances between these nodes are determined. The examiner maintains, however, that using a line-of-sight based device such as a rangefinder, radar, GPS, or other device would have been obvious to one of ordinary skill in the art and that such a method would inherently generate a distance that is the "direct way". Further, in light of the combination of Poppen with various example robotic systems (McNeil Tabata and Jacobs) below, the examiner further believes that such types of range finding are obvious. Tabata, for instance discloses ultrasonic line-of-sight rangefinding (Fig 2 items 6L and 6R).

With respect to claims 13 and 19, Poppen fails to disclose determining routes to pick and drop points (bins) associated with each zone and determining the distance thereto. Poppen does disclose several node points along a path in various zones (Fig 6).

With respect to claims 14-15 and 20, Poppen fails to disclose a resource determined to move on a given route and that only routes where said resource is able to move are determined. However, Poppen does disclose foreknowledge of the physical characteristics of the routes and whether or not one would be suitable for choosing (column 1 lines 56-60). In the below application of the method of Poppen to a warehouse robot, the examiner believes that such features are obvious. It would be a major oversight to plan a route for a robot that would not allow for its passage (with a large load as in Tabata) or with a potentially hazardous load in the case of McNeil and pharmaceutical components. One of ordinary skill in the art would have found it obvious to ensure that the route is applicable to the load in question.

Tabata teaches, with respect to claims 1, 10, 13 and 19, determining the distances

between points in a warehouse (column 4 lines 1-21). Tabata teaches, with respect to claim 13,

points associated with a route (column 2 liens 40-67).

Jacobs teaches, with respect to claims 1, 10 13 and 19, determining the distances between

points in a warehouse (paragraph 0093). Jacobs further teaches robots needing to return

periodically to re-supply/recharging docks (paragraph 0126). Since this particular robot is stated

to fill up on cleaning supplies (resources) and deposit them, these could comprise pick-up and

drop-off locations.

McNeil teaches, with respect to claim 13 and 19, drop-off and pickup points for resources

(bins) within a warehouse (column 16 lines 42-58) and robots needing to return to a recharging

dock (column 8 lines 37-39).

It would have been obvious to one of ordinary skill in the art that the method of Poppen

be applied to controlling warehouse robots such as those of Tabata, Jacobs and McNeil. The

examiner believes that the intent of Poppen is to present a navigation an analysis method

applicable to many things besides roads and driving (column 1 lines 21-60) including maps in

general. Jacobs further discloses a similar concept of work zones and nodes forming a path

based upon a map (paragraphs 0051 and 0056). One of ordinary skill in the art would have

found it obvious to apply these principles to the navigation of robots in general of which Tabata,

Jacobs and McNeil are examples in the art. Such combination would include determination of

path distances including to pickup or drop-off points of resources as taught by these references.

Both McNeil and Jacobs disclose the need for robots to return to docking stations to re-supply or

refuel and both Jacobs and McNeil disclose robots being applied for picking up and dropping off

(Tabata implies such application since it is used in luggage handling but does not specifically

point it out). One of ordinary skill in the art would have found it obvious to program in such

stops along the path or before beginning a functional journey. The robot would leave the

docking station, report to the pickup location, move to the drop-off and then dock once more or

perform further tasks before ultimately returning to dock. The examiner maintains that plotting

and programming additional points for the robot to travel to within various zones would have

been obvious to one of ordinary skill in the art.

2.

Claims 8 and 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Poppen, Teig, Tabata, Jacobs and McNeil as applied to claims 7 and 20 above, and further in

view of Anderson (US pat pub 20040068352).

With respect to claim 22, Poppen discloses a mandatory route representing a forced route

(Fig 6 items H and I which have only once choice in going to any other locations). Further, in

the combination of the method of Poppen with a robotic system as in Tabata, Jacobs or McNeil,

one of ordinary skill in the art would assume that there may arise a situation where only one path

is available (i.e. to go through the only door to leave a room for example). Additionally, one of

ordinary skill in the art would understand that certain sized (or types in the chemical

environment of McNeil) may require certain paths for fit or safety.

With respect to claim 23, Poppen disclose that there may be any number of possible

routes or groupings of routes (Figs 2-4). The addition of further options or nodes is obvious.

With respect to claim 24 it must be assumed that each resource type has associated

attributes descriptive of physical properties of the resource type. Although the references do not

explicitly state this, one of ordinary skill in the art would know that a resource inherently has

associated attributes that describe it. The language of the claim does not indicate what is done

with these attributes, how they are assigned, or how they relate to the invention as a whole.

With respect to claim 25 Poppen discloses associating with each node attributes which

are descriptive of physical properties of the node (column 1 lines 47-58).

With respect to claim 26, Poppen discloses associating with each route attributes, which

are descriptive of physical properties of the route (column 1 lines 38-49).

With respect to claim 27, Poppen discloses that the second and third pluralities of routes

are stored in a set of tables, each of the routes being reference able by the two nodes between

which the route is defined (column 11 line 64 – column 12 line 7).

With respect to claim 28, Poppen discloses defining a second plurality of zones with

entrance and exit nodes (Fig 6). The addition of further options or nodes is obvious as Poppen

discloses that there may be any number of "tiles". While Poppen does not disclose a warehouse,

the above combination with the robotic arts of Tabata, Jacobs and McNeil renders this obvious as

stated above.

With respect to claims 8 and 21, Poppen, Teig, Tabata, Jacobs and McNeil fail to disclose

detection of an obstacle with avoidance. Jacobs and Tabata each disclose sensors for avoiding a

collision and Poppen discloses foreknowledge of routes that will not work (an obstacle of sorts)

(column 1 lines 56-60).

Anderson teaches, with respect to claims 8 and 21, factoring in obstacles and directing

the route around such an obstacle (column 3 lines 12-17 and column 5 lines 47-52).

It would have been obvious to one of ordinary skill in the art to modify the method of

Poppen, Teig, Tabata, Jacobs and McNeil by including obstacle plan-around points. Poppen

seems to indicate that this is the intention (column 1 lines 56-60) as a criteria included among

cost etc. Anderson presents cost reduction as a similar goal (Figs 2-3b).
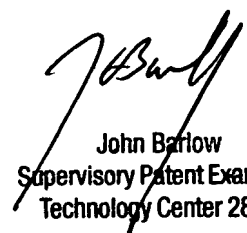
Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jonathan Moffat whose telephone number is (571) 272-2255.

The examiner can normally be reached on Mon-Fri, from 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

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like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

9/6/07

JM

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